The fate of extinction arguments

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Jonathan Schell's book *The Fate of the Earth*[1] makes three basic points: that there is a good chance that full-scale nuclear war could lead to the extinction of the human species, that extinction is

of immeasurably greater significance than even the largest massacre short of extinction, and that the nation-state system is at the root of the threat of nuclear war. These propositions are not new, but Schell's treatment of them has struck a resonant chord, especially in the United States where *The Fate of the Earth* has received extensive publicity and promotion. Because of the enthusiastic reception to them, Schell's arguments warrant close scrutiny.

Here, I argue first that Schell's arguments for a significant possibility of extinction due to nuclear war do not stand up to examination, and second that his focus on the system of sovereign states is well aimed but that his individualism and reformism greatly weaken the impact of this focus. This is an evaluation contrary to most reviews I have read, which praise his treatment of the effects of nuclear war but dismiss his political conclusions.

Before going further, it is probably necessary to say that nothing I say here should be taken to imply justification for nuclear war or preparations for it. Even if a major nuclear war were to kill 'only' several hundred million people, this would still constitute one of the greatest disasters ever to occur to humanity. Hence even the dangers of nuclear war *without* extinction justify the most

strenuous efforts to remove the underlying causes of modern war.

Since beliefs about the effects of nuclear war can have a big influence on the choice of peace movement strategies to oppose nuclear war, I consider it highly important to critically evaluate statements about the effects of nuclear war. And as an active member of the peace movement, I consider it doubly important to make such critical assessments, since military analysts are unlikely to make them for us.

Extinction?

For several decades many people have believed that major nuclear war could lead to the death of most or all people on earth. Yet, surprising as it may seem, there has been no detailed scientific argument presented to support this belief. In fact, Schell's treatment is the first carefully argued presentation that concludes that extinction is a significant possibility from nuclear war. For this reason alone his treatment deserves close attention.

At the end of the first of the three essays which comprise *The Fate of the Earth,* entitled "A Republic of Insects and Grass", Schell summarises some of the possible consequences of the explosion of thousands of megatonnes of nuclear weapons. These include

> "the blinding of insects, birds, and beasts all over the world; the extinction of many ocean species, among them some at the base of the food chain; the temporary or permanent alteration of the climate of the globe, with the outside chance of 'dramatic' and 'major' alterations in the structure of the atmosphere; the pollution of the whole ecosphere with oxides of nitrogen; the incapacitation in ten minutes of unprotected people who go out into the sunlight; the blinding of people who go out into the sunlight; a significant decrease in photosynthesis in plants around the world; the scalding and killing of many crops; the increase in rates of cancer and mutation around the world, but especially in the targeted zones, and the attendant risk of global epidemics; the possible poisoning of all vertebrates by sharply increased levels of Vitamin D in their skin as a result of increased ultraviolet light" (p. 93).

When nuclear weapons are exploded, the high temperatures cause nitrogen in the air to react with oxygen, producing

oxides of nitrogen. In explosions larger than about one megatonne, the fireball of the explosion rises the 10 or 15 kilometres necessary to deposit much of these oxides of nitrogen in the stratosphere, where the oxides of nitrogen destroy ozone. Since stratospheric ozone absorbs ultraviolet light from the sun, the net consequence of large nuclear explosions is an increase in ultraviolet light at the earth's surface. All the effects listed by Schell in the above quotation are possible consequences of large increases in ultraviolet light.

Scientific studies in the mid 1970s showed that stratospheric ozone in the northern hemisphere could be reduced by 50 percent for more for a few years by the explosion of 10,000Mt (megatonnes) of nuclear weapons. These are the studies on which Schell relies. But trends in nuclear weaponry over the past decade or so have reduced the likely effect on ozone. Instead of relying so much on multimegatonne warheads, the United States and the Soviet Union have been and are continuing to convert the payloads of their strategic ballistic missiles to larger numbers of smaller warheads, usually each less than one megatonne. Numerous smaller warheads can cause more destruction at ground level, but they don't deposit oxides of nitrogen in

the stratosphere in any quantity. So at least at the moment, the threats to human life from increases in ultraviolet light following nuclear war appear to be negligible.[2]

But even if stratospheric ozone were reduced by 50 percent or more, few of the consequences portrayed by Schell would result. For example, permanent blinding of humans or other animals seems very unlikely.

Stratospheric ozone levels vary considerably from place to place and time to time. Ultraviolet light passes through only about half as much ozone at the equator as at mid-latitudes, yet blindness in humans and other animals is not known to be more common at the equator than elsewhere. In addition, if ozone reductions did occur as a result of nuclear war, they would mainly occur in the northern mid-latitudes where ozone levels are higher to start with. So widespread blindness from ultraviolet light seems an unlikely possibility on two counts. Similar comments apply to the other dangers from ultraviolet light listed by Schell.

'Outright slaughter'

The only other possible basis for extinction listed by Schell is

> "the outright slaughter on all targeted continents of most human beings and other living things by the initial nuclear radiation, the fireballs, the thermal pulses, the blast waves, the mass fires, and the fallout from the explosions" (p. 93).

How does Schell arrive at the conclusion that the immediate effects of nuclear weapons could even kill "most human beings"? To start with, he treats fairly realistically the effect of 10,000Mt of nuclear weapons dropped on the United States (p. 54). Such an attack would indeed be catastrophic, potentially killing three quarters or more of the US population. Schell suggests that 10,000Mt could kill virtually all the US population due to fallout, since he says if the 10,000Mt were evenly distributed and all weapons exploded at ground level, all parts of the US would be exposed to ten thousand rads - and one thousand rads will kill all the people exposed to it. Yet this argument is quite dubious. First, not all weapons would be exploded at ground level. Second, as Schell notes, the fallout would not be uniformly distributed, so many areas would escape heavy contamination. Third, Schell takes no account of protection, for example by ordinary buildings. Most US houses have basements which could reduce radiation

levels by a factor of ten or more. These qualifications change Schell's picture to one showing the survival of at least several tens of millions of people in the US, in agreement with the usual run of studies which give no grounds for anything approaching extinction.

In any case, it seems unlikely that 10,000Mt could ever be delivered to the US by the Soviet Union. Total megatonnage in the Soviet arsenal is probably around 7500Mt (with 3500Mt in the US arsenal). In any war scenario except a completely successful Soviet first strike, it is likely that many Soviet weapons would be destroyed before use by anti-submarine warfare, anti-aircraft against bombers, or strikes against ICBMs. This plus missile unavailability and unreliability suggests that it is unlikely that even half the Soviet arsenal could reach the US. So Schell's 10,000Mt attack on the US is very much an extreme case, virtually impossible in practice.

But if all Soviet weapons were targeted on US targets, there would be none left for other places, such as China, Europe and Japan. Simultaneous extermination of people in all these areas seems out of the question. To kill most people on earth would require 10,000Mt or more on the US, 10,000Mt or more on Europe, 10,000Mt or more on China and so forth. Neither the Soviet Union

nor the US have anything like the arsenal or the delivery capacity to achieve this level of destruction.

At this stage in his argument, Schell makes a big jump with no justification. He asserts "most European countries would be annihilated by tens of megatons" (p. 65). The deaths of many millions of people might well result from attacks of this magnitude, but Schell does not show how 'annihilation' could possibly result. The danger of extinction from blast, heat and local fallout from nuclear attacks seems as remote as extinction from ozone depletion.

A final possibility is added by Schell to the list of effects quoted before:

> "that these consequences will all interact with one another in unguessable ways and, furthermore, are in all likelihood an incomplete list, which will be added to as our knowledge of the earth increases" (p. 93).

Schell is right on the point about possible effects not previously considered. For instance, in mid-1982 Crutzen and Birks[2] pointed out that fires started by a nuclear war could lead to blocking out of sunlight by a factor of from 2 to 150 for several months, leading to loss of a season's crops if the

war occurred during the northern summer. This could lead to widespread starvation in some regions.

Exaggeration

According to the published scientific literature on the effects of nuclear war, in a worst case a large fraction of the population in the US, Soviet Union and Europe could die, with many additional millions of deaths in Japan and China. But relatively few people would die in South America, Africa, India, South-East Asia and Australia, unless for some reason these areas were directly bombed. (Some of them may well be bombed, such as US military bases and possibly other targets in Australia.)

In a worst case, the direct effects of nuclear attacks could kill perhaps 500 million people, and conceivably several hundred million more could die if this were followed by agricultural or economic breakdown. This would leave alive, and mostly uninjured, some 4000 million. No one has demonstrated any effects of nuclear war which could kill more than a tiny fraction of people who live far from the immediate attacks.[3] But surely the possibility of 500 million deaths is enough reason to oppose preparations for nuclear war?

I was perplexed after hearing about Schell's conclusions and about the

sources he had used to reach them, since I had already read the same sources and had come across nothing that indicated that extinction was more than a remote possibility. The perplexity is explained by Schell's process of continually taking worst interpretations and bending the evidence to give the worst impression. For example, Schell implies that a nuclear attack is inevitably followed by a firestorm or conflagration, always gives the maximum time for people having to remain in shelters from fallout, and takes a pessimistic view throughout of the potential for ecological resilience to radiation exposure and for human resourcefulness in a crisis. And usually when he spells out a worst case as a possibility - for example, the average 10,000 rad radiation dose from a 10,000Mt attack on the US - this becomes implicitly a certainty for later discussion, with qualifications dropped.

'Pushing' of an argument to support a particular conclusion is a common phenomenon in science,[4] and Schell perhaps should not be blamed overly much for doing this, especially since in many of his arguments he relies heavily on quotes from specialists who do the same thing. What is more important are the political implications of a conclusion about the likelihood of extinction from nuclear war. There are many potential reasons why the effects of nuclear war

are exaggerated.[5] Here I will mention only two: the fear-mongering approach and a link with political reformism.

Fear-mongering

One of the approaches used by some people in the peace movement and other social movements is the generation of fear, whether this is over nuclear war, nuclear reactor accidents or overpopulation. The implicit premise behind much fear-mongering is that if people are not taking action on the issue, they must not perceive it as threatening enough. Perhaps if the thought of 500 million people dying in a nuclear war is not enough to stimulate action, then the thought of extinction will. Indeed, Schell explicitly advocates use of the fear of extinction as the basis for inspiring the "complete rearrangement of world politics" (p. 221). The popularity of the politics of fear may partly explain the popularity of Schell's treatment.

The fear-mongering approach is deeply flawed. It leaves out consideration of how people can take action, how social change can come about, and of what motivates people to act. It can cause paralysis rather than action. Furthermore, fear is a poor basis on which to build long term commitment to fundamental change in society.

Reformism

A second reason why the effects of nuclear war are often exaggerated is linked with the idea that nuclear war will be avoided when national decision makers realise the danger and decide to start disarming. The idea seems to be that once people - including national elites - realise the 'true' dangers, then they will take action. In reality, elites are mainly motivated by political and economic interests, not the dangers of nuclear war. Their very power and privilege, and the ideology which justifies this, are based on the institutions which give rise to the nuclear threat. So elites are the *least* likely to take fundamental action against the nuclear threat.

In addition, if the danger from nuclear war is believed to be enormous, immediate and final, then policy change at the top too often is assumed to be the only hope. There simply doesn't seem to be enough time for struggles for social change at the grassroots lasting decades or centuries. Exaggeration of the effects of nuclear war thus promotes the approach of appealing to the decision-makers. On the other hand, lack of a long term grassroots strategy against war, and disinclination to undertake such a path, tends to lead to ever greater extermination rhetoric. Doomsdayism

has often been linked with political reformism,[6] and this seems to be the case with much of the peace movement.

The second essay

The second portion of Schell's book, "The Second Death", is an extended and repetitive plea to recognise the ultimate nature of extinction. In the light of my criticisms of Schell's argument about extinction from nuclear war, this plea seems a bit beside the point. Or rather, it applies not just to nuclear war but also to other possible activities which might result in extinction. It seems to me that biological warfare, genetic engineering and some human-induced ecological changes pose a greater threat of extinction than nuclear war - though this may be because I haven't studied these other dangers in the same depth as those from nuclear war.

The implicit implication of the extinction argument is that if extinction is so much more cataclysmic than any massacre, then prevention of the potential cause of extinction warrants extraordinary efforts. This is not unreasonable. But it doesn't answer the question of what to do.

One significant feature of the second essay is an extended portrayal of science as neutral and independent of social pressures. The inadequacies of this view

are many and well documented.[7] Here it is only worth mentioning that Schell's idea that scientific knowledge is pure and untainted is, along with the idea that knowledge of the possibility of nuclear extinction will by itself cause political change, a reflection of a view of society without political and economic interests. Contrary to Schell, knowledge is intrinsically political in origin and use, and Schell's arguments themselves are a good example of this.

Nation-states

The third and final of Schell's essays, "The Choice", is an argument that the source of the nuclear threat is the nation-state system, and that the choice is between survival and national sovereignty. Most reviewers have found this essay the weakest in the book, yet I agree with Schell at least on the point that national sovereignty is a key to the nuclear threat.

Nation-states and modern-style military establishments developed hand in hand only a few hundred years ago. The experience of the past century is that the principle of national sovereignty is upheld by national elites even in the face of the most horrifying developments, including war and genocide.[8] The threat of nuclear war is no exception.

To focus on national sovereignty as a root cause of war is not a popular stance. This is because many people - especially social democrats and Marxists - see the nation-state as a focus for the *solution* to the problem of nuclear war. Peace movements are indefatigable in writing letters to national leaders, demonstrating their concern to decision-makers in marches and rallies, and in working through national political parties for policy changes. These can be useful approaches on issues that do not cut too closely to the essentials of state power. But when the objective is something fundamental to the state, such as workers' control in state bureaucracies, regional secession, or lessening the strength of the military establishment, the approaches of letter-writing, demonstrating and organising in political parties need to be supplemented by strategies for fundamentally transforming the economic, political and social system.

While Schell's focus on the nation-state system is a promising beginning, he lacks any suggestion of a political strategy for confronting or transforming the power of national elites. He lacks even an analysis of the sources of the nuclear threat and resistance to it. This is apparent when he refers, as he often does, to the source of the nuclear problem as 'we': "The self-extinction of

our species ... is an act that ... we plan in certain circumstances to commit" (p. 186). Contrary to Schell, it is structures of power and privilege, and the elites who run them and benefit from them, which are primarily responsible for the nuclear threat. Schell's political perspective incorporates many typical US attitudes, including a very US-centred view of the world and anticommunist stereotypes. He does not even know that the nation-state system is a relatively modern phenomenon (p. 187).

Schell does not attempt to spell out any plan of action, but it seems that he too is relying on the power of knowledge and public opinion to convince decision-makers of the folly of their ways (p. 230). This is just not good enough when powerful political and economic interests are involved. Schell's argument may gain some of its popularity from its implicit political premise that knowledge and not political and economic struggle is what is required to tackle the nuclear menace.

The challenge

What sort of activities would pose a fundamental threat to the nation-states and their military establishments? Here I can do no more than raise a few points. Some general criteria are opportunities

for widespread participation and initiative, non-reliance on key people at the top or on the national framework, and the provision of a positive alternative to military defence and other state functions. The feminist, environmentalist and nonviolent action movements are looking at how to organise political and economic life in decentralised, self-managed ways, including cooperatives, use of technology that can be controlled by communities, and human interaction through networks rather than hierarchies. These directions provide a basis for building alternatives to state structures. In addition, I suggest the following focuses as important ones in relation to defence.[9]

* Promotion of social defence at the grassroots level. Social defence is nonviolent community resistance as an alternative to military defence, and can be used against repressive governments as well as invaders. Methods include boycotts, strikes, refusals to obey, and setting up parallel institutions.

* Promotion of peace conversion, namely the conversion of military and other harmful production to production for human needs. Preparation for peace conversion can include not only plans and logical argument, but dissemination of information about and practice for

conversion by direct action should the opportunity arise.

* Struggles for equity and freedom, to remove institutionalised violence including economic oppression and political repression.

* Challenges to hierarchies, which are central to the military and state systems.

The belief in nuclear extinction seems to have inhibited peace movement thinking about the development of long term strategies such as these for transforming the institutional roots of war. A less exaggerated assessment of the effects of nuclear war does not necessarily mean less concern. Instead, hopefully, it can lead to more penetrating analyses and more successful strategies for ending the nuclear threat.

Footnotes

1 Jonathan Schell, *The Fate of the Earth* (New York: Knopf, 1982). This book originally appeared in *The New Yorker* early in 1982.

2 Paul J. Crutzen and John W. Birks, "The atmosphere after a nuclear war: twilight at noon", *Ambio,* volume 11, numbers 2-3, 1982, pages 114-125.

3 Brian Martin, "The global health effects of nuclear war", *Current Affairs Bulletin* (Sydney), volume 59, number 7, December 1982, pages 14-26.

4 Brian Martin, *The Bias of Science* (Canberra: Society for Social Responsibility in Science, 1979).

5 Brian Martin, "Critique of nuclear extinction", *Journal of Peace Research,* volume 19, number 4, 1982, pages 287-299.

6 Alan Roberts, *The Self-managing Environment* (London: Allison and Busby, 1979), chapter 1.

7 David Dickson, *Alternative Technology and the Politics of Technical Change* (London: Fontana, 1974); Hilary Rose and Steven Rose (eds), *The Political Economy of Science,* and *The Radicalisation of Science* (London: Macmillan, 1976); Rita Arditti, Pat Brennan and Steve Cavrak (eds), *Science and Liberation* (Boston: South End Press, 1980); Martin, note 4.

8 Leo Kuper, *Genocide* (Harmondsworth: Penguin, 1981).

9 Brian Martin, "Grassroots action for peace", *Social Alternatives,* volume 3, number 1, October 1982, pages 77-82.

Valuable comments on this article were received from Mark Diesendorf and Miko Kirschbaum.